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EXAMINER	
NGUYEN, KHAI MINH	

ART UNIT	PAPER NUMBER
2617	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/967,048	KASAPI, ATHANASIOS A.	
	Examiner	Art Unit	
	KHAI M. NGUYEN	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 11-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-9 and 11-22 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-9 and 11-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Alamounti (U.S.Pat-6560209).

Regarding claim 1, Alamounti teaches a method comprising:

receiving information in the form of data signal for transmission to a receiver (col.19, lines 43-52);

splitting the data signal into a plurality of sub-carriers (fig.1.6: binary source, spreader) to at least partially redundantly transmit the information over a multi-carrier wireless communication channel (fig.1.6-1.7: spreader, antennas 0-7);

splitting each of the sub-carriers into N signals one for each of a plurality of antenna paths (fig.1.6-1.7: spreader, antenna demultiplexer, antennas 0-7), wherein

each of the sub-carriers is to be transmitted over an array of N antennas (fig.1.6-1.7: antennas 0-7) using a different antenna path for each signal (col.15, lines 2-25);

modifying each of the sub-carriers by a set of complex weights (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25, col.20, lines 28-36), the sets of complex weights having a complex weight for each antenna path (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25, col.19, lines 43-53), to ensure that each of the N signals of each sub-carrier of the wireless communication channel propagates along a different physical path to the receiver (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25, col.19, lines 43-53), wherein the set of complex weights used to modify each of the sub-carriers includes different weights for each antenna path of the array (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25, col.19, lines 43-53).

Regarding claim 2, Alamounti teaches each element of the set of complex weights scales one or more of a sub-carrier's amplitude and/or phase at an associated transmission antenna (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25, col.19, lines 43-53).

Regarding claim 3, Alamounti teaches developing a set of complex weights including:

choosing substantially different weights, for each sub-carrier sharing information (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25, col.19, lines 43-53); and iteratively repeating until all sub-carriers have been modified (col.19, lines 43-53).

Regarding claim 4, Alamounti teaches the substantially different weights are chosen to be orthogonal to the others (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claim 5, Alamounti teaches developing a set of complex weights comprises: selecting weight vector(s) to be applied to each of the sub-carriers from a pre-determined set of weight vectors (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claim 6, Alamounti teaches transmitting the modified sub-carriers (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claim 7, Alamounti teaches a transceiver comprising:

a splitter module (fig.1.6-1.7), operable to receive a data signal for transmission to a receiver (col.19, lines 43-52);

split the data signal into a plurality of sub-carriers (fig.1.6: binary source, spreader) to at least partially redundantly transmit the information over a multi-carrier wireless communication channel (fig.1.6-1.7: spreader, antennas 0-7) and to split each of the sub-carriers into N signals one for each of a plurality of antenna paths (fig.1.6-1.7: spreader, antennas 0-7), wherein each of the sub-carriers is to be transmitted over an array of N antennas using a different antenna path for each signal (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25);

a diversity agent (fig.1.6, 1.7), operable to selectively apply a set of complex weight values to each of the sub-carriers (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25, col.19, lines 43-53), the sets of complex weights having a complex weight for each antenna path to introduce spatial diversity between such sub-carriers (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25, col.19, lines 43-53); and

a transmit module (fig.1.6, 1.7), coupled with the diversity agent (fig.1.6, 1.7), operable to receive the modified sub-carriers and transmit the signals to generate the multi-carrier communication channel with intra-channel spatial diversity (fig.1.6-1.7: spreader, antennas 0-7, col5, lines 8-19, col.15, lines 2-25), wherein each of the set of complex weight values include a plurality of weight values each associated with a different one of a plurality of antenna paths of an antenna array through which the sub-carriers are transmitted (fig.1.6-1.7: spreader, antennas 0-7, col.15, lines 2-25, col.19, lines 43-53).

Regarding claim 8, Alamounti teaches the plurality of signals received from at the diversity agent are baseband signals (fig.1.16).

Regarding claim 9, Alamounti teaches the multi-carrier communication channel is comprised of a plurality of sub-carrier signals (fig.1.6-1.7: binary source), each having a disparate set of complex weights introduced at a baseband of the sub-carriers to effect the spatial diversity between the sub-carriers (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claim 11, Alamounti teaches the transceiver is operable to develop the set of complex weight values for a given baseband signal to be maximally orthogonal complex weight values applied to another baseband signal (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claim 12, Alamounti teaches the transceiver is operable to develop a set of complex weight vectors for a sub-carrier that are substantially different from weight vectors modifying other sub-carriers that include at least a subset of information carried by the sub-carrier (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claim 13, Alamounti teaches the transmit module is operable to upconvert and amplify each of the modified baseband signals to generate a plurality of spatially diverse sub-carriers (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claim 14, Alamounti teaches the transmit module operable to transmit each of the sub-carriers to one or more receiver(s) (fig.1.6-1.7).

Regarding claim 15, Alamounti teaches a memory operable to store content (fig.1: binary source); and control logic, coupled to the memory, operable to access and process at least a subset of the content to implement the diversity agent (fig.1.6-1.7).

Regarding claim 16, Alamounti teaches the multi-carrier wireless communication channel uses Orthogonal Frequency Division Multiplexing (OFDM) (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claim 17, Alamounti teaches the multi-carrier communication channel uses Orthogonal Frequency Division Multiplexing (OFDM) (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claim 18, Alamounti teaches the transceiver is selected from a base station and a wireless telephony subscriber unit (fig.1; base station Z and remote station U).

Regarding claim 19, Alamounti teaches the transceiver develops the set of complex weights to have inter-channel spatial diversity with respect to at least one communication channel of at least one other transceiver (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Regarding claims 20 and 22, claims 20 and 22 substantially contain the same limitations as of the limitations of claim 7. Therefore, claims 20 and 22 are likewise rejected on the same grounds as of claim 7.

Regarding claim 21, Alamounti teaches each of the set of complex weight values are comprised of a plurality of weight values each associated with one of a plurality of antennae comprising an antenna array through which the sub-carriers are transmitted (fig.1.6-1.7: spreader, antennas 0-7, col.7, lines 5-33, col.15, lines 2-25).

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHAI M. NGUYEN whose telephone number is (571)272-7923. The examiner can normally be reached on 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vincent P. Harper can be reached on 571.272.7605. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AJIT PATEL/
Primary Examiner, Art Unit 2617

/Khai M Nguyen/
Examiner, Art Unit 2617 6/14/2010